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LATERAL CURVATURE

OF THE

SPINE,

ITS CAUSES, NATURE, AND TREATMENT.

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THE FOLLOWING PAGES ARE, BY PERMISSION,

Respectfully Dedicated,

WITH THE SINCERE GRATITUDE OF HIS FAITHFUL FRIEND
AND FORMER PUPIL,

THE AUTHOR.

PREFACE.

THE substance of the following pages has already appeared in my series of "Lectures on the Nature and Treatment of Deformities*." Through the advice of many professional friends,—and of one, especially, whose daughter has been under my care, and who, during the progress of the case, has from time to time put various questions to me as to the principle and plan of treatment I adopt,—I have been induced to publish in a separate form, my views and treatment of Lateral Curvature of the Spine.

* Longman and Co. 1846.

In doing so, I am influenced by a sincere desire to advance what I believe to be correct views.

That the subject is one upon which a general knowledge by no means prevails, will not be denied : hence the existence of so many books, treatises, &c. respecting it. In the words of a professional friend — “No well-informed surgeon will, now-a-days, dispute respecting the management of a distorted or dislocated limb : it is only in matters which are still in doubt, or regarding which the general information is incomplete, that contrariety of opinion and of practice exists.”

Convinced that Lateral Curvature, so formidable in its effects, is as simple in its nature,

and as easy of cure, as many which come successfully under the care of the surgeon, I again put forth my views and suggestions for its treatment. They are the result of many years' experience, and confirmed by daily observation; and I confidently submit them for the consideration of the profession.

I may here mention that patients very frequently state to me that, when consulting surgeons of eminence even on account of Lateral Curvature of the Spine, they have been dismissed with an assurance that "they would outgrow their disease." On my best observation and experience, I am induced to consider this a grave error.

It is opposed, I think, to sound physiological

views of the disease in question ; and, certainly,
I have never witnessed any such instances of
spontaneous cure.

33, OLD BURLINGTON STREET :

January 1852.

ON

ERRATUM.

Page 21, line 1, for "crutches," read *couches*.

rence, though comparatively but little attention is paid to it by professional men, in a purely scientific or physiological view. By lateral curvature is understood that condition in which the spine, deviating from its perpendicular direction, produces an alteration in the position of the ribs, scapulæ, and the muscles attached, with a corresponding change in the form of the cavities of the chest, and, at times,

of the abdomen. This state of deformity arises—

1st. From any cause by which the movements of the lower extremities are rendered irregular ; in other words, when the uniformity of their action is destroyed.

2dly. From general debility, or simple loss of the healthy tone of the system ; from general debility consequent upon, or combined with, true rachitis, with its attendant and unhealthy state of constitution.

3dly. From any occupation by which the muscles of one side, or of one extremity, are more frequently exercised than those upon the opposite side.

This deformity originates and exists independently of any disease of the bones, ligaments, or muscles attached,—the rachitic

condition alone excepted ; of which there are but 22 cases out of 647 in the statistical report of the Orthopædic Hospital.* The immediate cause of deformity in all cases is purely mechanical—namely, the superincumbent weight of the head and upper extremities, combined with an instinctive effort, always in operation, to retain the head in the perpendicular position with the sacrum, with inability of the muscles and ligaments to accomplish this object when once a permanent curvature has taken place.

When the movements of one or other of the lower extremities are rendered irregular by any deformity of the knee, of the hip, or of the foot, an undue lateral motion constantly takes place in the spinal column. By this increased and unnatural motion the ligaments become gradually and abnormally elongated ; and, unless

* Vide Introductory Lecture, Med. Gaz. for Nov. 14, 1851.

the general health of the patient is good, and the spinal muscles well developed, a deviation of the spine from the perpendicular line certainly and inevitably follows. If unattended to, the curvature becomes permanent. Cases of this kind are constantly occurring: paralysis of the extensors of the leg and flexors of the foot, with contraction at right angles of the gastrocnemius, causing a constant impediment to the proper use of the leg, which produces an undue amount of motion in the spinal column, by the efforts of the patient to balance the body while taking exercise, and which terminates in lateral and antero-posterior curvature.* In such cases

* In a case which recently came under my notice, that of a female, aged 12 years (the daughter of a medical gentleman), who was afflicted with paralysis of the extensors of the right knee and flexors of the right foot, with contraction of the tendo-achillis and biceps flexor femoris, it was found necessary to apply supports under both arms, attached to the stays, to prevent lateral curvature from taking place.

attention must not only be directed to the deformity in the foot, for which alone assistance is often sought, but also to the spine, which invariably suffers.

General debility, or simple loss of the general tone, is of all others the most frequent cause of this deformity, especially in persons of the higher and middle classes of life, who are placed beyond the necessity for exertion — whose education and habits, enjoined by custom, are totally at variance with the due performance of the several functions of the body, the exercise of which is absolutely necessary for muscular development and the preservation of health. In the *Cyclopædia of Practical Medicine* I find the following statistics of the routine of a boarding-school, showing the amount of exercise, or rather the extent to which the want of exercise prevails in such establishments. The accuracy of the descrip-

tion I can personally vouch for from repeated inquiries :—“ At 6 o'clock in the morning the girls rise ; from 6 to 8, learning or saying lessons in school ; 8 to half-past 8, breakfast ; half-past 8 to 9, preparing lessons out of school, some of the girls being permitted to do so in the garden ; 9 to 1, at various tasks in school ; 1 to half-past 1, out of school, but must not go out of doors—reading or working, and preparing for dinner ; half-past 1 to 2, at dinner ; 2 to 5, in school, various tasks ; 5 to half-past 5, tea ; half-past 5 to 6, preparing to go out, dressing, or reading, or playing in school ; 6 to 7, walking generally arm in arm in the high road, many with their books in their hands and reading. Two days in the week they do not walk in the evening at all, being kept in for dancing ; but, by way of amends, they go out on two other days from 12 to 1, and then they miss writing. It is to be remarked that they never go out unless

the weather is quite fine at the particular hours allotted for walking. They go to church, all the year round, twice every Sunday, on which day no other exercise is taken ; from 7 to 8, for the older girls, reading or working in school (this is optional), and then prayers ; for the younger, play in school and prayers ; at 8 the younger go to bed ; from 8 to 9, the older reading or working as before ; 9, to bed. The twenty-four hours are therefore thus disposed of :—In bed, 9 ; in school at their studies and tasks, 9 ; in school or in the house—the older at optional studies or work, the younger at play, $3\frac{1}{2}$ (younger only $2\frac{1}{2}$) ; at meals, $1\frac{1}{2}$; exercise in the open air, 1. The above account was taken from a second or third-rate school, and applies more particularly to the season most favourable for exercise (summer).

“ It is to be remarked that the confinement is generally greater in these than in schools of

a higher order. That the practical results of such an astounding regimen are by no means overdrawn is sufficiently evinced by the following fact—a fact which, we will venture to say, may be verified by inspection of hundreds of boarding-schools in this country. We lately visited, in a large town, a boarding-school containing forty girls; and we learnt, on close and accurate inquiry, that there was not one of the girls who had been at the school two years (and the majority had been as long) that was not more or less crooked. Our patient was in this predicament; and we could perceive (what all may perceive who meet that most melancholy of all processions, a boarding-school of young ladies in their walk) that all her companions were pallid, sallow, and listless. We can assert, on the same authority of personal observation, and on an extensive scale, that scarcely a single girl (more especially of the middle classes) that has been at a boarding-school for two or three

years returns home with unimpaired health ; and for the truth of the assertion we may appeal to any candid father whose daughters have been placed in the situation. Happily, a portion of the ill health produced at school is in many cases only temporary, and vanishes after the return from it. In the schools in which the vacations are frequent or long, much mischief is often warded off, by the periodical return to the ordinary habits of healthful life ; and some happy constitutions unquestionably bid defiance to all the systematic efforts to undermine them. No further proof is needed of the enormous evil produced by the present system of school discipline than the fact, well known to all medical men, that the greater proportion of women in the middle and upper ranks of life do not enjoy even a moderate share of health ; and persons not of the medical profession may have sufficient evidence of the truth by comparing the relative powers of young men and young

women of any family in taking bodily exercise, more particularly in walking. The difference is altogether inexplicable on the ground of sex only."

By such habits of life the muscles are relaxed and attenuated so as to be unfitted for the performance of their proper functions, and are easily and quickly fatigued. The ligaments are then called upon to perform an increased office, which they also are incapable of bearing. They therefore gradually yield, and become elongated, allowing the spine to deviate from its proper position. When once this occurs, an increase more or less rapidly follows, if unattended to, as the strain upon the ligaments becomes permanent, producing additional elongation, and consequent deformity.

General debility from any casualty; from the febrile diseases of early life—such as

measles, scarlet fever, &c.—or from a rapid growth, will of course produce the same results, in any position, and under any circumstances.

The last cause mentioned is any occupation by which the muscles of one of the upper extremities are more frequently exercised than those of the other—such as nursing; when, however good may be the general health, the muscles of one side become more developed than the muscles of the other. The balance of power is thus destroyed; by which the stronger muscles overcome their weaker antagonists, and lateral deviation takes place.

The curve with rachitic combination is of all others the most serious; inasmuch as here the bones are incapable of performing their proper functions; that is, of acting as a support and fulcrum for the muscles, without yielding in the one or the other direction. In such cases an

actual alteration of the bones takes place, so that they present a serious addition to the simple malposition common to other cases, as well as a more severe distortion of the spine and chest than either of those to which I previously alluded. It is by no means uncommon to find this rachitic state associated with tubercular disease.

Lateral curvature, when unaccompanied with rickets, generally commences about the age of ten or twelve years. The first object which attracts attention is a fulness or projection of the shoulder—the shoulder corresponding with the convexity of the curve ; also a supposed enlargement of the hip, generally the opposite side to the upper curve. Upon placing the patient in the horizontal position, an undue amount of lateral motion in the spinal column is generally observable. The curvature is perceived only when the patient is in the erect or sitting

posture; and when in the horizontal, very slight pressure will not only straighten the spine, but carry it beyond the straight line, producing temporary curvature in the opposite direction. As the head cannot be retained in the perpendicular position with the sacrum, and we have only one portion of the spine curved, a second curve takes place lower down, in the lower dorsal and lumbar vertebræ. As the deviation proceeds, the ribs, from their direct attachment to the vertebræ, suffer also from displacement, and project upon the convexity of the spinal curve, falling in upon the concavity. Hence the fulness or projection of one shoulder, and the depression or the flattening of the other. The sides of the chest and abdomen alter in shape, according to the nature of the deformity; being hollow on the concavity of the curve, round and projecting on the convexity. The ribs become compressed, and approximate to one another, also to the ilium

on the one side—raised from the ilium, and separated from one another more or less upon the opposite side, which gives one of the hips an appearance of increased size. For this alone patients often apply for relief, and are more alarmed at the supposed enlargement of the hip than at the curvature. The height of the shoulders is unequal; the one appears raised, the other depressed, and more or less approximated to the hip of that side. The chest also partakes of the alteration of form; being flattened and depressed on the side corresponding with the convexity, full and projecting on that of the concavity. The bodies of the vertebræ likewise of necessity deviate from their normal position; being more or less separated from each other in the convexity of the curve; approximated, and in close apposition, on the concavity. The intervertebral substance, from the continued and undue pressure to which it is subjected on the concavity of the curve, becomes at first com-

pressed, and eventually, in the most severe cases, of many years' standing, absorbed; whilst the ligaments are elongated on the convex side, and contracted on the concave side, offering the most obstinate resistance. The muscles on the convex side are rendered more prominent, less so on the concave side, from the alteration of their position by the spinal deviation in connection with the deviation of the ribs.

Such are the general consequences of curvature of the spine in the form of the italic *S*. Occasionally a treble curve takes place from similar causes; the one high up, confined to the lower cervical and upper dorsal vertebræ; a second, abruptly following it, and confined to the dorsal vertebræ—generally the largest of the three; and a third in the lumbar, so that the head is still retained in the perpendicular position with the sacrum. Sometimes

this addition of curvature in the cervical vertebræ is associated with posterior curvature of the upper dorsal, and the flattening of the ribs; and thus the appearance of deformity is distressingly increased.*

In the greater number of cases, the bones of the spine, ilium, or chest, do not suffer; the affection is but a simple malposition, implicating more especially the passive attachments or ligaments, and the position of the muscles. In the more severe cases, as well as the rachitic, there is not only a lateral deviation, but also a partially rotated condition of the vertebræ; and, when the curvature commences under 5 or 6 years of age, as it commonly does in the rachitic cases, an actual compression of the bodies of the vertebræ occurs in the concavity of the curve.

* Vide fig. 4.

The ribs, partaking of the softened condition of the osseous system, become flattened, and present not only a projection or fulness, but an actual angle posteriorly, more or less acute.* This also is to be met with in some patients who do not suffer from true rachitis. The scapula on the projection becomes raised, and instead of the glenoid cavity looking directly outwards, as in its normal position, it is directed forwards, the spine outwards, and the venter inwards. In fact, this bone is altogether out of its position, which, with the fulness given to the trapezius muscle, presents the appearance of a large tumour growing upon the shoulder and back of the neck, approaching the ear, whilst the head sinks between the shoulders.

A short time since, a medical gentleman consulted me for what he imagined to be a

* Vide fig. 4.

tumour upon his daughter's shoulder and back : and more recently another member of the profession residing in the country sought my advice under a similar impression. It is difficult to convince professional men that this is occasioned by the trapezius muscle being thrown out of its proper place ; but so great is the displacement in some cases, that it is a matter of surprise that the functions of respiration and circulation can be carried on. In the most severe cases, respiration is in fact principally confined to the abdominal muscles. This explains why some patients, severely afflicted, possess a tolerable state of health.

The general symptoms are those usually attendant upon a weakened state of constitution,—such as inability to undergo ordinary exertion without a sense of fatigue, a constant feeling of lassitude and debility, neuralgic pain in the side, or sides and back, sometimes to a great extent ; at others, an extreme

amount of irritation throughout the whole of the spinal column, which I have particularly noticed in cases of slight curvature occurring at about the age of puberty, occasioned in all probability by the gradual stretching of the ligaments*. The catamenia are com-

* The following is an illustration of one out of many cases of this description which I have met with both in my private practice and at the Orthopædic Hospital. I give it in the patient's own words:—"In 1836, suffered pain in the head and chest, accompanied with shortness of breath and cough. I was treated for overflow of blood to the head, and was frequently cupped and blistered; then treated for heart complaint, as I suffered pain in my side, accompanied with great weight, for which I have been frequently blistered without effect. In 1849 my left arm and hand became so weak that I nearly lost the use of it." This was a case of very slight curvature. The symptoms all disappeared, and the perfect use of the arm was restored through the use of the instrument described in fig. 3; and although some surgeons of more or less authority have not hesitated to state that slight curvature could not produce such symptoms, and have even refused to see patients while wearing the instrument—notwithstanding their declaration that they experienced such relief and improvement in the general health as enabled them to resume their ordinary duties—yet, a large experience convinces me that all these symptoms are not unfrequently the result of even slight deviations of the spinal column in the adult.

monly irregular, attended with much suffering. Palpitation of the heart and difficulty of breathing are experienced upon slight exertion. Bowels confined, and appetite bad. Rest disturbed.

Various causes of spinal curvature have been assigned by numerous writers: amongst others, the use of stays, which most certainly of themselves do not produce this deformity, for they are worn by all classes of society; whereas, the rich and affluent are the most frequent sufferers from spinal affections.

The treatment of lateral curvature has formed the subject of so many publications, and the opinions of the legitimate portion of the profession have been, and still are, of so conflicting a nature, that many unfortunate patients are still consigned to the mercenary quack and to the unprincipled

empiric. Thus, we hear of crutches of all kinds, reclining boards, pulleys, passive supports, and persons employed as rubbers, &c.; added to which, the time occupied in the empirical treatment has been of so long duration, and the results so uncertain and unsatisfactory, that the conscientious professional man has not had the courage to undertake the treatment of these cases owing to *imaginary* difficulties. The general cause of lateral curvature is debility, unattended with disease. It is *precisely* analogous in its nature and cause to other deformities in other joints—namely, debility, or loss of tone;—for example, that common deformity, knock-knees or inward inclination, of which so large a number are found in the Report*: the only difference is, that here we have but one joint instead of many. In the deformity termed

* Introductory Lecture: vide Med. Gaz. Nov. 14, 1851.

flat-foot, in which many articulations are in a similar manner affected by the same cause, producing a falling of the bones of the tarsus and metatarsus, and destruction of the arches* ; in curvature of the bones of the lower extremities, arising also from general ill-health and muscular relaxation, and analogous to curvature and flattening of the ribs in this affection, the ligaments in the two former mentioned illustrations first becoming stretched and elongated, and admitting of the deviation, which thus terminates in deformity. The indications of treatment, therefore, are as simple in this as in any other distortion, or as in that of a common dislocation ; differing in no respect, in principle, from any of the more severe de-

* A professional friend justly observes—"The girl so treated (speaking of boarding-school routine) will become flat-footed, as surely as she has already become crooked-backed." It is a common observation with medical men that all physical indisposition with females begins with what is called education.

formities that we are called upon to conduct. The proposed treatment, I believe, is founded upon sound physiological views. In all other deformities which admit of cure, after removing a great obstacle—viz. that presented by the most powerfully contracted muscles—the passive attachments yield, upon the application of well-regulated pressure and counter-pressure ; and, provided there is no malformation, the natural form is restored. In paralytic cases, in which there is an unusually relaxed state of the ligaments, experience proves that even these ligaments will recontract, and with sufficient strength to hold the articulations or bones in their proper relative position when subjected to the pressure of the weight of the body. The spinal column, as I have endeavoured to prove, differs in no respect, except in that of its position and the number of its articulations, from any other articulation ; possessing, however, this great advantage, that, as far as my

means of observation have extended, in no case of lateral curvature has a paralytic condition of the muscles been met with. And if from general ill-health the muscles of the spine are rendered incapable of performing their proper offices, the ligaments do not form an exception to the general rule ; but, as in all other instances, yield and become elongated : thereby, as I have before stated, admitting of a deviation from the perpendicular position, which increases with as much rapidity as any deformity, from the powerful mechanical cause thus brought into active operation—namely, the superincumbent weight of the head and shoulders.

The plan of treatment that I pursue is most simple—namely, to support the spine in such a manner that, while the deformity is being cured, relieved, or any increase prevented, the patients may be enabled to follow

their usual avocations, and to take such general exercise as is conducive to, and absolutely necessary for, the preservation of health. In incipient cases, in which the curve is slight, and that only when the body is in the erect posture, attention to the general health, relaxation from studies, combined with change of air and change of scene, rest upon the sofa, so as to take off the weight of the upper portion of the body, will remove the tendency to the deformity. In those cases in which the curve is slight (as in fig. 1), though permanent, even when of some years' duration, as a rule it admits of being perfectly cured. In cases in which the lateral deviation is considerable, the ribs, although greatly displaced, retaining their form, and the spine, when subjected to pressure in the horizontal posture, yielding considerably, the deformity can at all times be relieved, not unfrequently cured.

A patient, aged 40, the relative of a professional gentleman, applied to me two and a half years since, having suffered from considerable lateral curvature, with displacement of the ribs, for twenty-five years. She had been for years under one of the most respectable of that class of persons who treat these cases, and during that lengthened period was subjected to stretching, to a wonderful variety of exercises, rubbing, &c. &c. with such an amount of benefit as was produced whilst undergoing the ordeal, but which ceased upon her resuming the erect posture. I ordered an instrument, such as is represented in fig. 3, which was worn about two years, and until about three months since, without intermission, night and day. From the commencement of treatment the general health improved, and has continued uninterruptedly good. Her back is straightened, and has gained sufficient strength for it to retain the perpendicular position when

the support was removed. The patient has now left off the instrument; has a passive support to fit the figure attached to the stays, and enjoys a state of health such as she has not known for twenty-five years. Many other cases could be detailed of a similar character, proving the great benefits derivable from this plan of treatment.

In patients with severe curvature past the age of puberty, provided ankylosis has not taken place (a most rare occurrence) great relief can be afforded. In a severe case of curvature with great displacement and flattening of the ribs on the right side, similar to figure 4, I so reduced the curvature as to increase the height of the patient (aged 34 years) one inch and a half in less than six months, with the perfect restoration of health. In rachitic cases, where the bones are altered in form, of course a cure is out of the question.

Our efforts can then only be directed to the application of efficient support, in order to prevent the increase of the deformity, and, as far as is prudent, relieve that already in existence.

In the division of cases I have purposely avoided allusion to the length or condition of the curve, whether greater above or below, inasmuch as they are found in all varieties, and do not alter the indication for treatment: neither have I alluded to the side on which the principal curvature takes place, for it is invariably on the right side; the rachitic cases, and cases occurring at an early age, only excepted.

The plan of treatment that I find most applicable and successful is, the use of instruments of my own invention, which possess the power of adaptation to any form of curva-

ture, with the pressure so applied that no part is interfered with beyond the pelvis and the projection, where it is required ; having a crutch on the concavity of the curve attached directly to the band, which assists in taking off the weight of the body, and preserving the balance of the instrument.* In cases of curvature of long standing, it requires to be worn night and day, so that no return to the malposition can take place ; for if the just position be not constantly maintained, the ligaments cannot recontract, neither can the resistance offered by them on the concavity of the curve be so effectually overcome. This rule is found to be necessary in every deformity, excepting only the most slight ; and to me it is a matter of surprise that men who devote their attention to this subject can overlook its importance. Some persons imagine that the health must

* Vide figs. 1, 2, 3, and 4.

suffer by the constant use of the instrument night and day; but, what is the fact? that, as an invariable rule, the patients improve under its use. I cannot illustrate this more strongly than by the following case:—A child, aged about two years, had an attack of paralysis of the right upper and the left lower extremity. This, by judicious treatment under one of our most distinguished physicians, was relieved, but was followed by such an amount of weakness that there was scarcely a sign of muscular power. The back curved throughout, and was more like a piece of India-rubber than a column of bones; the head falling by its gravity on the sternum, or back, or to either side, according to the position in which the child was placed. I applied a double crutch and webbing band (fig. 1) to act as a passive support, and directed that the child should be allowed to roll about on the ground, not placed in the perpendicular position, except

for necessary purposes. The child gradually gained strength, and then I applied the double pad and crutch (vide fig. 4). His knees also yielded inwardly, for which a support was used. The spinal instrument he has worn night and day. The back is now very nearly straight. The child runs about with as much activity as other children, and is full of life and spirits. The head is now retained in its proper perpendicular position ; and, when the instrument is removed, the back also preserves its position. This was an instance, the most marked that could be produced, in which results have been obtained beyond the most sanguine expectations ; and, had not the requisite instrument been worn incessantly, the child could never have regained strength ; for he would have continued as at first when placed in the perpendicular position—doubled up. Where, I would ask, is the cruelty, or the imminent danger, that some have been

bold enough to ascribe to the use of the instrument at night, when it does not interfere with the rest of the patient in the slightest degree? I have a patient, aged twenty-five, who wore an instrument night and day for five years: she suffered from the most severe curvature, and that from childhood—so severe that, by placing my clenched hand in the concavity, it was not parallel with the side above and below; and she never knew what it was to be free from ill health and suffering: since its application she has enjoyed good health, and been free from suffering. Although, in this patient, cure was out of the question, yet the ribs have come out in the concavity, the side is of its natural form, and the functions of respiration and circulation, both seriously interrupted before, are now perfectly and uninterruptedly performed. These results may be witnessed by all who will visit the wards at the Hospital in Bloomsbury Square.

Again, allow me to ask what, without such means, is to become of the poor milliner and dress-maker, the nurse-maid, and others in the humbler class of life who apply at the Orthopædic Hospital, and are now enabled, by this plan of treatment, to follow their occupation, and to preserve their health ?

I would here mention another instance of a boy about 16 or 17 who had severe double curvature similar to that represented in fig. 2. He was sent to a gentleman who treats those cases in his own house. The message returned was, that nothing could be done, and that the best thing for him was to give up his sedentary occupation (an engraver) and become a cab driver. This proposal would have destroyed his prospects in life, as well as perpetuated an evil that would, as long as life lasted, have occasioned a weak state of health, if not one of positive suffering. He then applied at the Hospital, and was admitted as an

out-patient.—In 6 or 7 months the back was brought into the straight position, the boy following his usual occupation the whole time. He has since married ; and I am informed is in perfect health. As regards the omission of the constant use of the instrument, I have only to say that such practice is at variance with what I conceive to be sound physiological views in the treatment of this and all other deformities.

Particular exercises have been and are recommended. But these are at direct variance with scientific treatment. Exercises are of use only where we find nothing more than the disposition to spinal curvature. In delicate patients, well regulated and gentle exercises, with good diet, cold bathing, bark and chalybeates, will effect wonders in the way of prevention ; but when a cure is called for, other means must be put into operation. No one will deny that the

exercise of muscles increases their development. Therefore, to exercise the muscles of a curved back by the use of pulleys, and a variety of other modes, is to create a direct obstacle to successful treatment, for not only are the muscles exercised on the convexity of the curve, but also on the concavity, which, by an increase of development, augments the resistance already present. As well, and with as much reason, might the muscles of the foot or leg be subjected to daily exercise during the time that we are removing the deformities in those articulations; or, to take an extreme illustration, the muscles of a fractured leg, whilst union is taking place. The only exercise that I have ventured to use, and that but rarely, was the horizontal action of the flexors and extensors of the arm situated on the concavity of the curve, with a view of developing the rhomboidei muscles, and that portion of the trapezius

situated opposite to the concavity. When a back is straight, then let the muscles be exercised as much as is consistent with the feelings of the patient, but not before.* In all

* The following is the literal statement made to me by a patient from a Spinal Hospital, of the course of treatment she received there:—9 o'clock till 1, swinging, climbing a ladder, and turning a wheel; then hung up by the head for half an hour; then laid on a couch for an hour; then dinner; laid on the couch till 5; then a walk (in summer); then to bed.

Another case is thus described by the patient herself, about 30 years of age:—The curvature began between 9 and 10; consulted the late Sir A. Cooper and Mr. Headington, and others—all said she would grow out of it, advising the sea-side, no stays, and rest in the horizontal posture. Back continued to get worse until 15. Then consulted a physician (now deceased) who confined his attention to the treatment of spinal distortions. Was under him four years and a half, during which time she never rose up for any purpose not even her head. The first thing in the morning a belt was fastened round the waist, with chains attached to a leather strap, which fixed the hips at the bottom of a couch; crutches fastened under each arm, which were attached by straps to the top of the couch. In this position she was stretched with a windlass as much as could be borne. Whilst this was going on she was rubbed with oil for half an hour; after rubbing, stretching increased. An assistant to that

cases daily walking exercise should be taken ; and, as soon as the back is straight, if the circumstances of the patient permit, horse exercise, with the use of the instrument at the same time. I have found great advantage from the adoption of this plan.

Objections have been raised to the use of the band round the pelvis, from the supposition that pressure upon that part would inter-

gentleman then used to pull the head with such force as, to use the patient's expression, she thought would have broken her neck. Then pressed with a steel roller upon the spine. After this ordeal, shields were applied, and laced on with stays, and she was made to lie flat on her back, having a board to press on the projecting shoulder. Sometimes slept on the stretcher. Her health suffered severely from the treatment, which she at length gave up. For a short time resumed the erect posture, but was compelled again to have recourse to the horizontal position, for on sitting up she was seized with fainting, which compelled her to resume the horizontal posture for two years and a half before I saw her. The instrument represented in fig. 2 was applied. In two months she began to improve in health, is now able to take ordinary exercise, and sleeps better in the instrument than without it.

ferre with its development, and offer an obstacle in the process of parturition. This, however, was completely set at rest by the late Mr. Shaw, who made every inquiry, and found that the pelvis was never influenced : in fact, those who know the difficulty of altering the position of a curvature in the bones of the lower extremities will never entertain such fears. With a view of improving the general health, and giving tone to the stomach and bowels, small quantities of the decoction of aloes with ammonia and bark two or three times a day, I find of great service. Tonics are useful when the stomach is in order ; but when not so, instead of giving tone, they act as irritants. Small quantities of beer or wine are also beneficial. The division of the spinal muscles is practised in France. I operated upon one patient. The result proved that as much and more certain progress can be made by mechanical means alone than with the

operation. I therefore consider it a severe and an unnecessary step.

The use of the instrument requires great delicacy and care, and particularly the fitting ; for if it does not properly fit the patient, it cannot be worn with comfort or used with advantage. The pressure should be regulated daily according to the feelings ; and, if undue at any part, relief should be at once given. It requires constant supervision during the active part of the treatment ; for, as it cannot be made a fixture on the body, it of course alters more or less its position ; and when it does, the effect is nullified.

When the back is straight, I apply a support attached to stays, which perfectly fits the figure,—a steel plate, about two inches wide, sewn on the stays on one side and a crutch on the other, which prevents the possibility of a relapse.

DESCRIPTION OF THE DEFORMITIES.

FIG. 1.

A representation of Slight Lateral Curvature, for which the Instrument represented in Fig. 2 is most applicable.

FIG. 2.

An illustration of Double Lateral Curvature, acutely marked, for which the Instrument represented in Fig. 4 is used.

FIG. 3.

Severe case of Lateral Curvature, with great displacement of the Shoulders, and of the Cavities of the Chest and Abdomen, for which the Instrument Fig. 3 is applicable.

FIG. 4.

Severe Lateral and Posterior Curvature of the Spine, combined with the rachitic state, and flattening of the ribs,

which also present posteriorly an angular projection.—The Instrument represented in Fig. 3 is also applicable for these cases ; and when the head falls between the shoulders, as sometimes happens when curvature in the cervical vertebræ also coexists, I use with great advantage a head-piece, which is made to slide upon the back-bar, having a cog-wheel ; so that the head can be raised according to the feelings of the patient.

DESCRIPTION OF THE INSTRUMENTS.

FIG. 1.

The most simple form of Mechanical Support ; consisting of a Band to fit the pelvis, with an upright crutch on each side. The shaft of the crutch consists of two portions united, —the lower portion having a groove, or slit, throughout its length, fitted with screws, by which it is attached to the upper portion, forming a moveable slide, by means of which the length of the shaft may be increased or diminished at pleasure. At the bottom of the shaft, and immediately above the band, are cog-wheels for regulating the position and bearing of the crutch, so that undue pressure upon the sides is prevented, and at the same time that the erect posture of the body is preserved, the motions of the shoulders may be limited as circumstances require.

FIG. 2.

Band and Crutches similar to Fig. 1, with the addition of a pad attached to an upright bar behind, having a double cog-wheel at the bottom, by which it can be so adjusted as

to support the spine in cases of slight deviation. Affixed to the side of the pad by means of a cog-wheel is a crutch which supports the shoulder on the projection, and gradually restores it to its proper position.

FIG. 3.

Belt and Single Crutch, upright back bar, and pad with crutch attached, and double cog-wheel, as in Fig. 2, with an additional cog-wheel and hinge in the centre of the bar;—applicable to cases similar to deformities Figs. 3 and 4.

FIG. 4.

Band, Single Crutch, and Double Pad,—for Double Curvature; one pad for the upper, the other for the lower curve,—with double cog-wheel at bottom, and crutch to upper pad as before, and cog-wheel and hinge for each pad.—Applicable to cases of double curvature with extreme debility, as well as to severe cases of double curvature, as represented in deformity Fig. 2.

Various modifications of these instruments have been introduced, but I have seen none which can in any degree be considered as improvements in point of utility. On the contrary, they all appear to diminish their efficiency.



Fig. 1.

C. Chabot, Linoxy 9^e Stanner 5^e City.



Fig. 2.

C. Chabot, Zincog. 9°. Scannet St. City.

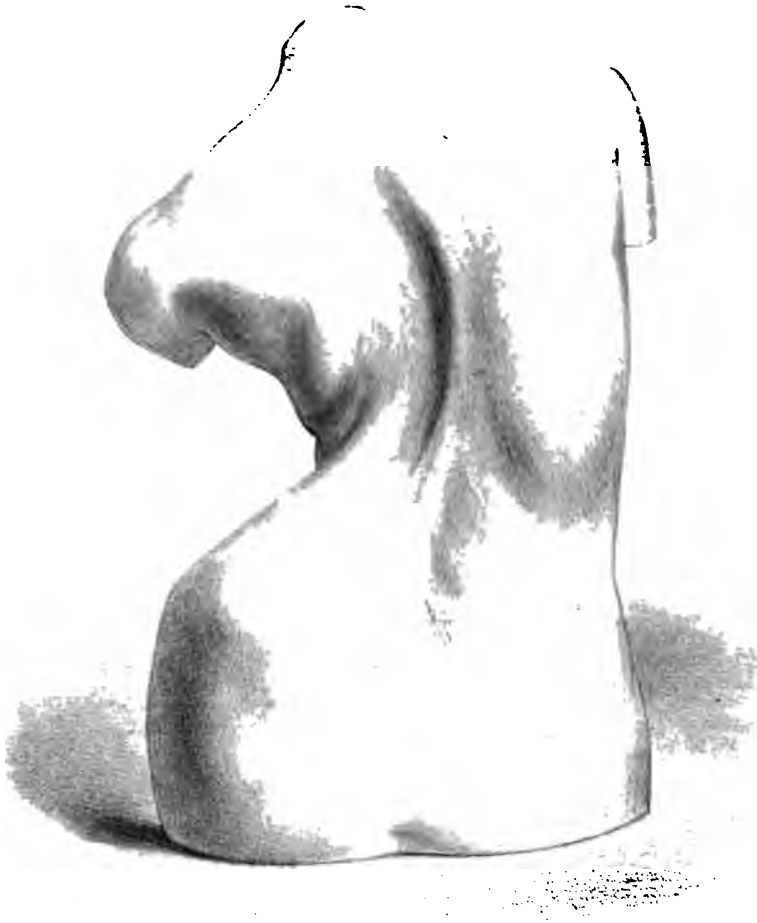


Fig. 3.

C. Chabot, linogr. 9° Steiner 3° City.

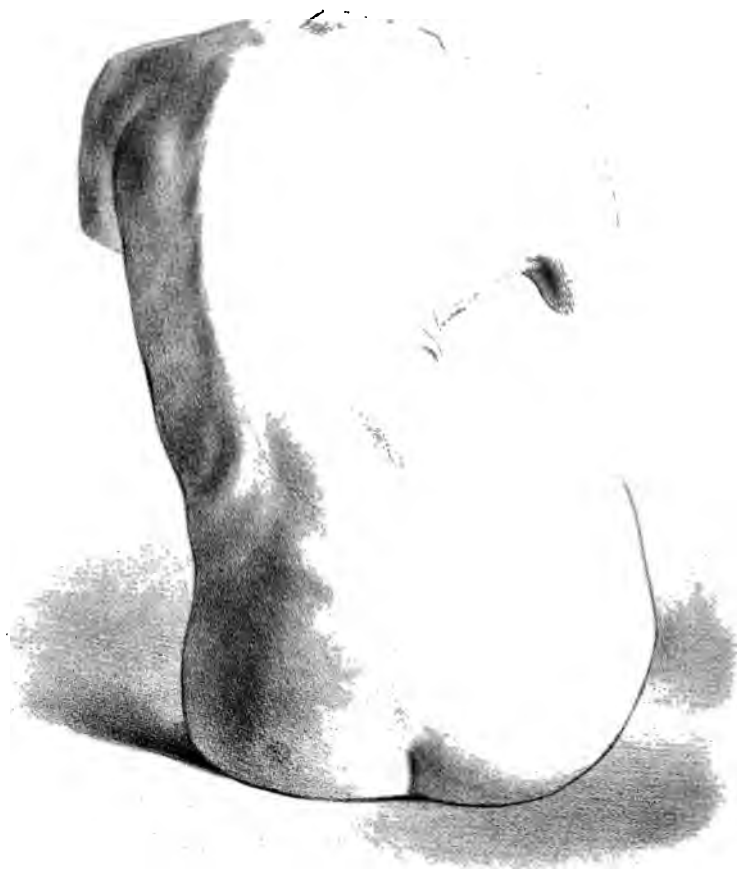


Fig. 4.

C. Chabot, Lincog 7 9° Skinner S 4 1/2

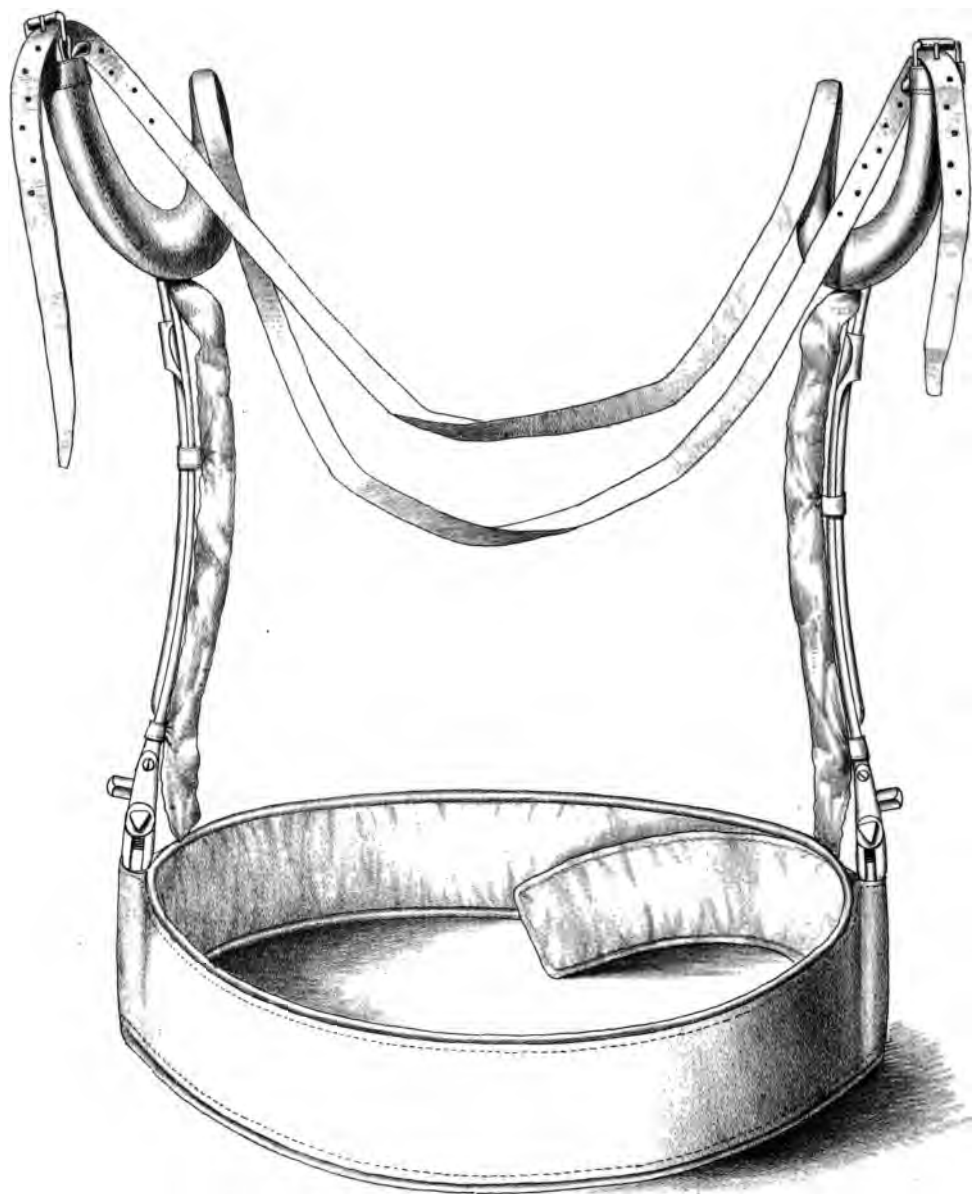


Fig. 1.

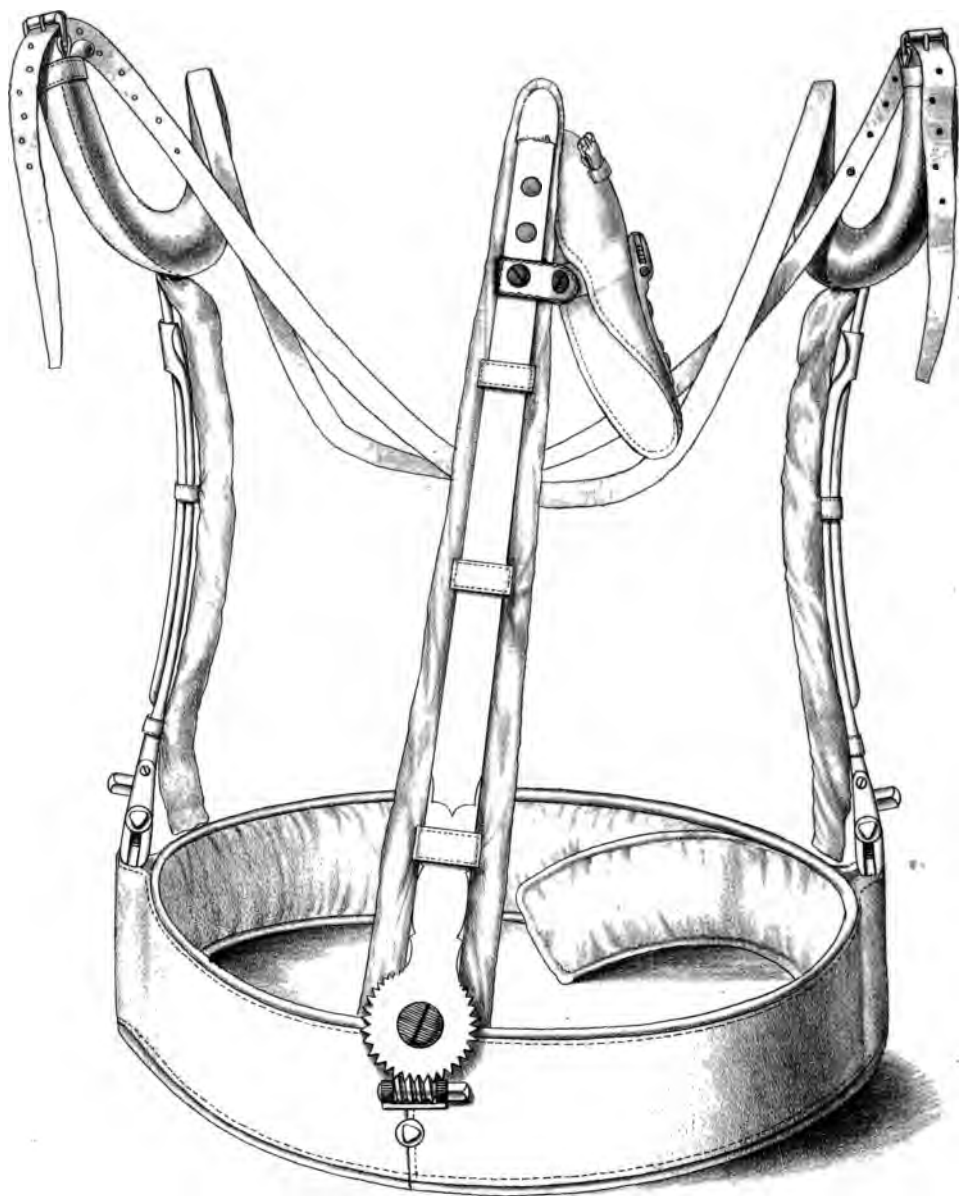


Fig. 2.

C. Chabot, Lencog 9° Steiner-S° City.

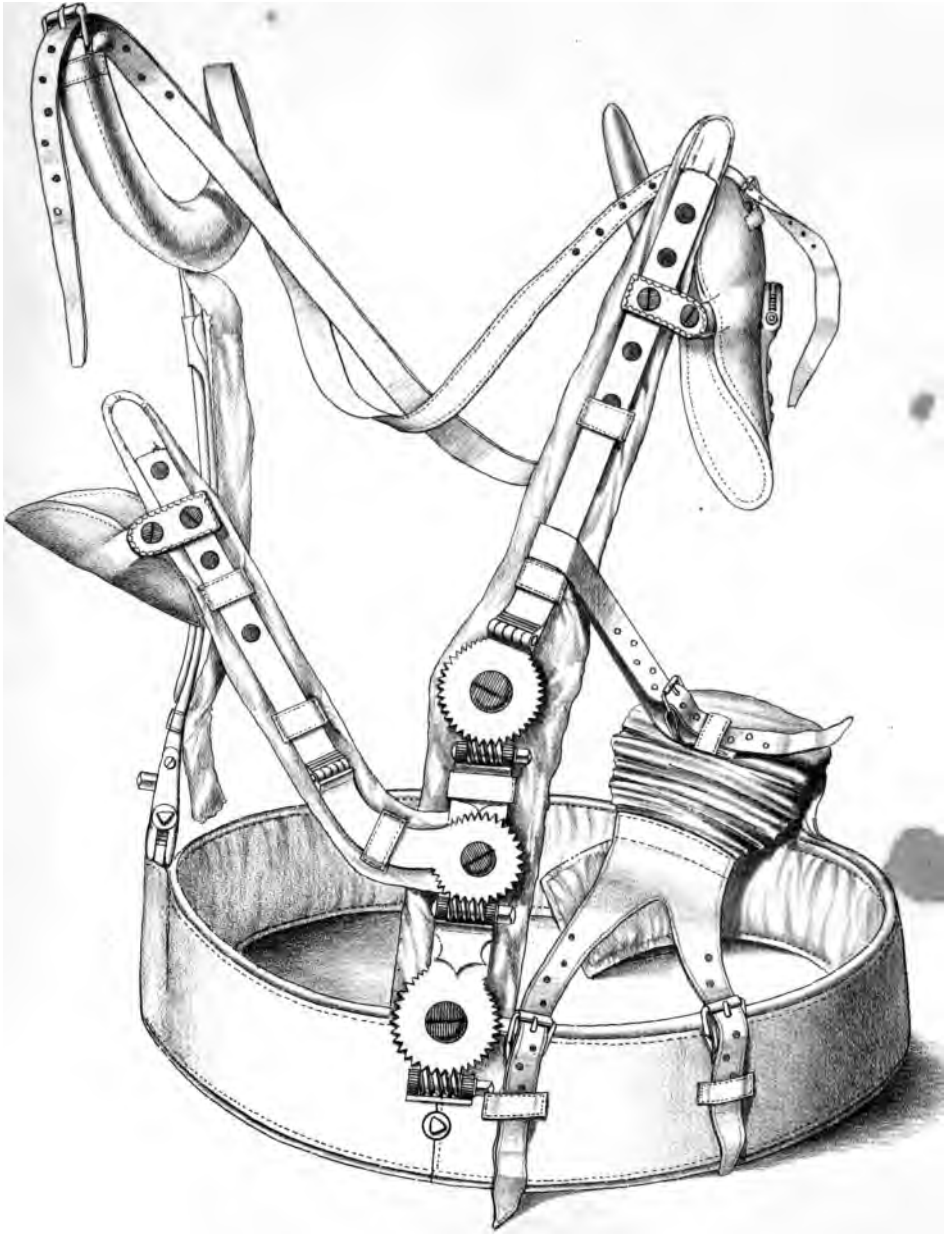


Fig. 4.

ROUND BY



